FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL

SENT VIA ELECTRONIC MAIL

September 29, 2014

Mr. Dave Noble
City Engineer
City of Ottawa
301 W. Madison Street
Ottawa, IL 61350

RE: City of Ottawa
Remedial Planning Proposal
Little City Building

Dear Mr. Noble,

At the request of the City of Ottawa, Illinois, Fehr Graham performed an investigation of the Little City Building at 112 West Madison Street, to ascertain the existing conditions and to make recommendations for necessary shoring and stabilization to allow the asbestos to be mitigated.

The information contained in this report does not contain every deficiency in every location and is intended solely to address those areas which require shoring and stabilization to safely mitigate the asbestos.

We visited the site on August 28–29, 2014 and made the following observations:

Observations

Dimensional and General Information

The building is a five-story masonry structure on a full basement with the front of the building facing south. The building is basically rectangular in shape with the northwest corner cut back. The overall dimensions are approximately 52' wide in an east to west direction and 110' long in a north to south direction, with the northeast corner cut back approximately 20' east-west and 30' north–south. There is an alley along the west elevation of the building and adjoining buildings along approximately the south 80' of the east elevation.

There are two main column rows in the building. The west row is approximately 18' east of the interior of the west wall and the east row is approximately 14' west of the interior of the east wall. At the south end of the east row of columns, the southernmost column is approximately 4' farther west. The columns are round and constructed of either steel or cast iron. The columns decrease in diameter from the basement, where they are approximately 9" in diameter, to the fifth floor, where they are approximately 6" in diameter. The columns are stacked over one another. A third column row, consisting of only two columns is located approximately 4' west of the east wall, with the south column approximately 46' north of the interior of the south wall.

Areas of the plaster ceiling are missing, allowing for partial observations of the floor framing. There are steel beams between the columns in a north-to-south direction, and

several locations with additional steel beam framing between the columns and the steel beams. From the areas which are exposed, the steel framing appears to be consistent throughout the building from the second floor through the fifth floor.
The first floor framing varies from that of the other floors. The majority of the first floor joists are full sized 3" x 12" joists at 16" centers. There is a small area of full size 2" x 12" joists at 16" centers, spanning approximately 7' near the center of the building. At the south end of the first floor, from the west column row to the interior basement wall, for a north to south distance of approximately 20', there are steel beams spanning east to west at approximately 30" centers with formed concrete between the beams in the shape of an arch.

The second through fifth floor framing consists of full size 2" x 12" joists at 16" centers, spanning east to west, supported at the masonry walls on the east and west and the steel framing in the center bay.

The floor to ceiling heights were measured for each floor. The basement floor to the underside of the first floor framing was measured to be approximately 9'. The first floor to the underside of the second floor framing was measured to be approximately 13'. The second, third, fourth, and fifth floors were all measured to be approximately 10'. At the fifth floor, the measurement was to the underside of the ceiling joists. The distance between the ceiling joists and the roof joists varies due to the roof slope, with a maximum open height of approximately 5'. Using a structural floor depth of approximately 1', the overall height from the basement floor to the roof is approximately 68'.

The basement used to house the boiler has additional masonry walls in the southeast portion of the building. A reinforced concrete beam carries the front wall of the building. There are vaults under the sidewalk in front of the building.

Exterior Observations

The south elevation of the building consists of masonry and stone. The first floor has been boarded to prevent access. No structural issues were observed for the south elevation. See Photograph No. 1.

The west elevation of the building consists of masonry. The windows have been infilled with masonry. Areas of missing and soft mortar, brick spalling, and isolated missing bricks were found. Approximately 45' north of the south end of the west elevation, the wall was observed to be bowing slightly outward over the alley. See Photograph No. 2.

The north elevation of the building has many windows which have been either boarded or infilled with masonry. Evidence of the removal of a chimney was found at the east end of the north elevation in the cut back area. Isolated areas of missing and soft mortar were found intermittently along the elevation. See Photograph No. 3.

Approximately the south 80' of the exterior of the east elevation, below the fourth floor, cannot be observed due to the adjoining buildings. The remainder of the east elevation was found to exhibit areas of soft mortar and small areas of missing mortar. The majority

of windows in this elevation have also been either boarded or infilled with masonry. See Photograph No. 4.

The roof was accessed from the interior of the building. The roofing material is either loose or completely missing over the entire roof, with areas of the decking boards exposed. In areas where the roofing material is present, the roofing is either improperly flashed to the parapets or pulled away. Portions of the parapet walls are missing or crumbling, and parapet wall caps are missing over a portion of the roof. See Photographs No. 5, No. 6, and No. 7.

Interior Observations

Along the west wall, beginning approximately 36' north of the south wall, one entire bay of the building has collapsed from the fifth floor to the basement. This area is approximately 18' wide, east to west, and approximately 15' x 3" inches north to south. The west wall in this area is laterally unsupported for its entire height. This location corresponds to the observation of the wall bowing outward over the alley to the west. See Photographs No. 8 and No. 9.

The floor joists to the south of the collapsed bay are sagging various amounts at the west wall. The joists have either lost bearing at the west wall or have deteriorated and are failing. At the second floor, the joist adjacent to the collapsed bay is sagging approximately 1', and the adjacent floor joists are sagging lesser amounts, for a distance of approximately 6'–8". The amount that the joists adjacent to the collapsed bay are sagging increases proceeding upward. The fifth floor joists adjacent to the collapsed bay are estimated to be sagging 4–5'. See Photographs No. 8, No. 10, and No. 11.

The first floor joists exhibit water staining and are heavily covered with mold in several areas. The first floor sheathing is water stained and portions of the first floor sheathing are heavily damaged. No structural concerns were noted to the arched concrete floor and steel beam system. See Photographs No. 12 and No. 13.

Throughout the building, the floor joists and floor sheathing are water stained and have varying amounts of water damage. See Photographs No. 13 and No. 14. The stairs between floors are in poor condition and exhibit numerous holes and missing portions of treads and risers.

The floor sheathings throughout the building at every floor have deteriorated and large areas of the sheathing are unsafe for use. Holes through the floor sheathing are evident at numerous locations, regardless of the floor. The center bay, immediately east of the collapsed bay, is particularly deteriorated. See Photographs No. 15 and No. 16.

A large area of the fourth floor joists in the center bay, immediately east of the collapsed bay, have split and are broken. Approximately 12 floor joists have either completely split and are broken, or are in the process of collapse. See Photographs No. 17 and No. 18. The fifth floor joists above this area are in similar condition.

The roof framing is visible in areas where the plaster ceiling has collapsed. The majority of the roof framing consists of 2 x 12 timber joists at 16" centers, with the exception of the area above the collapsed bay. In this area, newer timber floor trusses have been installed at some unknown date. See Photograph No. 19.

The reinforced concrete beam supporting the front wall of the building and the reinforced concrete slab/sidewalk over the vaults exhibit some concrete spalling and exposed and corroded reinforcement. However, these areas are in good to fair condition with no evidence these areas are structurally inadequate. The access door was found to be corroded and exhibit holes due to corrosion. See Photograph No. 20.

Conclusion

In my professional opinion, the asbestos in the existing building cannot be safely mitigated without bracing and shoring the current structure.

The collapsed floors along the west elevations have rendered the wall unsupported for its entire height. Masonry walls rely upon the lateral bracing provided by the floor systems. The bowing of the west wall observed from the exterior is consistent with unsupported masonry walls of this height.

The sagging floors immediately south of the collapsed bay require shoring to safely mitigate the asbestos. Removal of the sagging portions was considered, however, removal of the floors will result in additional lengths of the west wall being unsupported. Further, any vibrations that are caused by the removal could be detrimental to the exterior masonry walls.

The areas of the fourth and fifth floors with split joists will require two rows of shoring, one each side of the splits, to render these floors safe for foot traffic. These floor areas were considered for complete removal. However, removing these failed portions of the floor without first installing new floor joists further reduces the effectiveness of the floor system to act as lateral bracing to the walls. Further, any vibrations that are caused by the removal could be detrimental to the exterior masonry walls.

Repairs to all levels will require access between floors, which is currently limited due to the poor condition of the stairs. Removal and replacement is necessary rather than reinforcement in place.

Once shoring and bracing are in place, temporary floor sheathing can be placed on the floor to allow access to the areas which require mitigation.

Stabilization of the existing building and re-roofing the building at the earliest time possible is essential to extending the life of the building. Without stabilization and re-roofing, in my professional opinion, the building may suffer from a partial or full collapse.

Recommendations

In order to safely mitigate the asbestos in the existing structure, we recommend the following:

1. Install exterior horizontal bracing to the west wall. Installation of this bracing will require closure of the alley to through traffic. The bracing is recommended to be constructed of 40' long Hollow Structural Sections (HSS) 12" x 6" x 1/4", anchored to the masonry wall, and placed at the second through the fifth floor levels and at the fifth floor ceiling level. The HSS sections are proposed to be centered on the area where the floor has collapsed, and shims will be needed to ensure the bracing is in full contact with the wall. This bracing is not intended to take the bow out of the wall and is for stabilization only. Sketches outlining this recommendation are included in the attachments.

2. Install interior shoring to stabilize sagging floors along the interior of the west elevation, south of the collapsed bay. The shoring will need to begin in the basement level with each floor level progressively jacked back into position. The shoring is recommended to be constructed of 2" x 8" studs at 16" centers with diagonal bracing located no more than 1' from the west wall, once the floors are jacked into position. The shoring walls will need to be stacked over each other from the basement to the fifth floor. A 2' wide x 1' thick concrete pad, reinforced with #4 bars on the top and bottom, each way, is recommended to be poured on top of the cleaned basement floor to act as a footing to spread the load.

3. Install two rows of shoring in center bay where 4th and 5th floors failing. The shoring is recommended to be constructed of 2" x 8" studs at 16" centers, with diagonal bracing. The two rows of shoring are also recommended to be diagonally braced to each other at quarter points along their length. The shoring will need to proceed from the basement to the fifth floor framing.

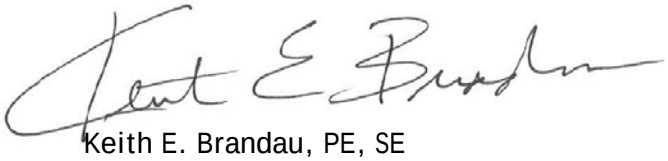
4. Replace stairs between floors.

5. Place temporary floor sheathing in areas where the existing sheathing is failing, to allow access for mitigation.

Engineer's Estimate of Probable Construction Cost

Item	Estimated Cost
1. Exterior bracing	$ 120,000
2. Floor shoring at the west wall	$ 50,000
3. Double row of floor shoring in center bay	$ 20,000
4. Replace stairs	$ 10,000
5. Temporary floor sheathing for asbestos mitigation	$ 2,000
Subtotal	$ 202,000
25% Contingency	$ 50,500
Total Estimate of Probable Construction Cost	$ 252,500

Sincerely,



Keith E. Brandau, PE, SE
Lead Structural Engineer

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Attachments

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